Author's response to reviews

Title: Cholecystectomy in Sweden 2000 - 2003: a nationwide study on procedures, patient characteristics, and mortality

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Author's response to reviews:

Answer to Reviewer 1

Shortcomings of the national registry database

* Indication for cholecystectomy is provided by the ICD10 codes ascribed to all hospital stays (with cholecystectomy). In the file for each stay it is also indicated whether the admission was elective or acute.
* In the former version of the manuscript we pointed out that the day of operation is not stated in the register. This is further clarified in the new version. For planned cholecystectomy it is usually the day of admission, for patients admitted as emergencies it depends on the diagnostic efforts done and the policy of the unit concerning acute cholecystitis and acute gallstone pancreatitis. We have omitted the term postoperative stay, which by mistake was used once in the former version of the manuscript.
* The Hospital Discharge Register is governed by The National Board of Health and Welfare in Sweden through its Epidemiological Centre. Validation of register data is done continuously. Information given below is taken from the website, which is provided in our manuscript: http://www.sos.se/epc/english/ParEng.htm. Some of this information is now given in Methods.

Information available in the Swedish Hospital Discharge Register

There are four different types of information in the Hospital Discharge Register:

Data on the patient
- personal identification number
- sex
- age
- place of residence

Data on the hospital
- county council
- hospital
- department

Administrative data
- date of admission
- date of discharge
- length of stay
- acute/planned admission
- admitted from
- discharged to

Medical data
- main diagnosis
- secondary diagnoses
- external cause of injury and poisoning
Reporting procedures
Information to HDR is delivered once a year to EpC from each of the 21 county councils in Sweden. EpC gets a magnetic tape or disc with one data file for the whole county council. Every discharge during one year corresponds to one record in that file.

Quality of data and underreporting
The very rapid changes of hospital organisation in Sweden makes estimations of underreporting hard to make. This is especially true for psychiatric and geriatric care. The total number of drop-outs for somatic short-time care for the period 1987-1991 has been estimated to less then 2 per cent.

For all records reported to HDR a data control is run. A check is made that compulsory variables are reported, e.g. personal identification number, hospital and main diagnosis. A check is also made that codes for different variables and dates have valid values. Some obviously incorrect data is corrected in connection with the quality controls.

Personal identification number
The personal identification number (PIN) makes it possible to follow a patient between different hospitals and over time. The number of stays 2003 with missing PIN was 0.7 per cent. Some counties are better than others in reporting PIN and some others are among the best every year.

Main diagnosis
In 2003 the main diagnosis was missing in 0.9 per cent of the hospital stays reported. For acute somatic care 0.5 per cent was missing and for psychiatric care 8 per cent was. The dropouts in main diagnosis are concentrated to a few county councils.

Discharged deceased or alive
The information in HDR for 1964-2003 where the patient was deceased at the discharge has been compared with the date of death from the Swedish Cause of Death Register (CDR). Of the total number of 1.5 million discharges during the years 97 per cent had a date of discharge that differed less than three date of death according to CDR. For the year 2003 the same percentage was 99.9.

Discussion
We have tried to follow the conventional way: Give the main findings, discuss strengths and weaknesses of the study, discuss findings in relation to previous studies, and state conclusions/recommendations. In the new version we have started each section with our own observations to discuss them in the light of previous data. Hopefully, that will make the Discussion more clear.

Conclusions
As the reviewer, we are absolutely clear that there is a heavy selection bias involved in the choice of open or laparoscopic cholecystectomy. Hence, no comparisons can be on an intention to treat basis between the two methods. This is also stated in the second paragraph of the Discussion. However, we can in retrospect study the selection process (patient characteristics) and outcome (mortality) as the techniques were finally used. This is in fact the theme of the article. According to literature (level 1 evidence) conventional open cholecystectomy is more traumatic than the alternatives, laparoscopic cholecystectomy and mini-laparotomy cholecystectomy. From a public health perspective it is appropriate to question whether we should use less traumatic methods for the most fragile patients. One obstacle to such a change is the infrequent use of small-incision cholecystectomy in Sweden today.

Minor essential revisions
* For patients over 80 we give numbers and standardised mortality within 90 days of index admission and 91 - 365 days of admission for both open and laparoscopic cholecystectomy.
* Numbers 43072 is correct. Thank you for observing a printing error. We have corrected this throughout the manuscript.
We agree that the most relevant information is given in Tables.

Answer to reviewer 2
The selection process for laparoscopic and open cholecystectomy has been discussed in answer to reviewer 1.

Answer to reviewer 3
The meaning with "selected for" in the last paragraph of the Introduction has been omitted.